

Code No: 113BR

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, May/June – 2015

BASIC ELECTRICAL ENGINEERING

(Common to CSE, IT)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Write the differences between active and passive elements. [2M]
- b) Explain star to delta transformation with an example. [3M]
- c) In a series R–L circuit, the p.d. across the resistance R is 12 V and the p.d. across the inductance L is 5 V. Find the supply voltage and the phase angle between current and voltage. [2M]
- d) A coil has a resistance of 4Ω and an inductance of 9.55 mH. Calculate i) the reactance, ii) the impedance, and iii) the current taken from a 240 V, 50 Hz supply. [3M]
- e) Define the regulation of single phase transformer. [2M]
- f) Define the efficiency of single phase transformer. Explain the effect of power factor on the efficiency. [3M]
- g) Define slip. What is the relationship between slip and speed of the induction motor? [2M]
- h) Differentiate between self excited and separately excited dc machine. [3M]
- i) Explain the classification of instruments. [2M]
- j) What are the different types torques acting on the moving system of measuring instrument? [3M]

PART-B

(50 Marks)

- 2.a) State and explain Kirchoffs' laws with an example.
- b) Find the equivalent resistance R_{ab} for the circuit shown in figure 1. All the resistor values are 30Ω . [5+5]

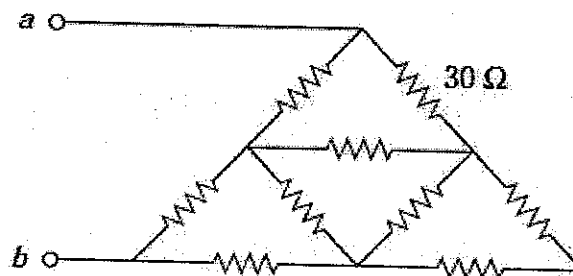


Figure 1

OR

- 3.a) Calculate V_0 and I_0 for the circuit shown in figure 2.

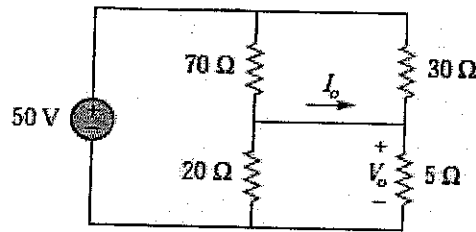


Figure 2

- b) Using superposition theorem find v_x for the circuit shown in figure 3. [5+5]

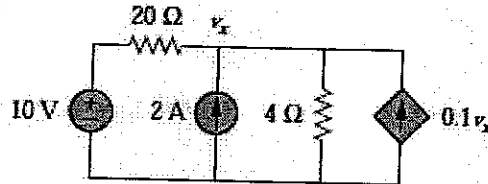


Figure 3

- 4.a) A coil of resistance $5\ \Omega$ and inductance $120\ \text{mH}$ in series with a $100\ \mu\text{F}$ capacitor, is connected to a $300\ \text{V}$, $50\ \text{Hz}$ supply. Calculate:
- The current flowing.
 - The phase difference between the supply voltage and current.
 - The voltage across the coil and
 - The voltage across the capacitor.
 - Draw the phasor diagram.
- b) A coil of inductance $80\ \text{mH}$ and resistance $60\ \Omega$ is connected to a $200\ \text{V}$, $100\ \text{Hz}$ supply. Calculate the circuit impedance and the current taken from the supply. Find also the phase angle between the current and the supply voltage.

[7+3]

OR

- 5.a) Define the following:
- Alternating Quantity
 - R.M.S. Value
 - Average value
 - Form factor.

- b) A coil having a resistance of $10\ \text{ohms}$ and an inductance of $0.2\ \text{H}$ is connected in series with a $100 \times 10^{-6}\ \text{F}$ capacitor across a $230\ \text{V}$, $50\ \text{Hz}$ supply, Calculate
- The active and reactive components of the current.
 - The voltage across the coil, Draw the phasor diagram.

[6+4]

- 6.a) Draw and explain the phasor diagram for an ideal transformer on no-load.
- b) A $500\ \text{V}/100\ \text{V}$, single-phase transformer takes a full load primary current of $4\ \text{A}$. Neglecting losses, determine:
- The full load secondary current, and
 - The rating of the transformer.

[6+4]

OR